Long Conversations: Budapest/Bristol mathematics student teacher links

Laurinda Brown, University of Bristol, School of Education

John Hayter, Jánossy Zsolt

Laurinda.Brown@bristol.ac.uk

In 1990, Jánossy Zsolt came to the Bristol, UK from Budapest, Hungary to join the one-year post-graduate course at the University of Bristol that prepares people of a wide range of ages for mathematics teaching. John Hayter and Laurinda Brown were, at that time, tutors for the course. More particularly, Zsolt joined John Hayter's study group and John became his personal tutor for the year. John and Laurinda taught in the university and visited the members of their study groups in schools when they were on school practice (2 different schools over the year). Ambrus András was the head of the Faculty at Eötvös Loránd University (ELTE) and, alongside Ödön Vancsó and other members of the *Matematika Szakmodszertani Csoport* (teacher education department), was part of the long conversations over two decades between staff and students at the two institutions. This chapter shares stories from these long conversations, of which this chapter, to celebrate András's 75th birthday is the latest contribution.

The chapter will be divided into three parts. John Hayter will set the scene describing what happened in the early years and the setting up of the Bristol/Budapest links. Laurinda Brown will share memories of the many times over the years she hosted Hungarian student teachers in the UK and went to Budapest with UK student teachers supported by some thoughts from a few of those students. Jánossy Zsolt will share reflections of his interactions with Bristol over the years. What has underpinned these long conversations is an openness to see differently and see more that international collaborations afford.

1 An historical perspective of the Budapest/Bristol mathematics student teacher links from John Hayter

It was in that post-freedom period of the early 1990s that the British Council took an interest in supporting the development of mathematics and science teacher training in Hungary. John Hersee, a lecturer in mathematics education at the University of Bristol, had long standing connections with mathematics educators in Eastern Europe through the annual International Mathematics Contests and through ICMI (András edited *Mathematics Education in Hungary: Report for ICME – 8,* which was held in Budapest in 1996). John Hersee was also aware of the strong traditions and high reputation of mathematics education in Hungary with the long-standing emphasis on problem solving. John Hersee was invited to

visit ELTE University in Budapest to explore possible ways in which a formal link with the School of Education at the University of Bristol might be mutually beneficial.

Following meetings and the exploration of possibilities, a project was proposed, which the British Council agreed to support (1989-1993). A major element was the opportunity for two mathematics graduates from Budapest to follow the one-year Post-Graduate Certificate in Education (PGCE) course at the University of Bristol. The first students arrived in September 1989 and quickly became valued members of the PGCE group of students who were of more varied ages and came from many universities and professions around the UK. The Hungarians rose to the challenge of communicating, orally and in writing, in English and were able to share insights into mathematics and teaching with the British students. They undertook the usual teaching practices in schools in and around Bristol supported by teachers in the schools (mentors) and university tutors. One of these teaching practices was for around three months from January to early April, a chance to become embedded in a school culture. The quality of these young Hungarian people impressed those with whom they came into contact while in the UK.

It occurred to me, that perhaps an additional element could be attached to the already established project programme, namely, visits by a wider group of students in some sort of exchange arrangement. I visited Budapest in 1994 to learn more about the training of teachers at ELTE in Budapest and to explore the idea of an exchange programme. I was able to meet several academic staff including Ambrus András, whose interest in (and knowledge of) mathematics education beyond Hungary was quickly evident. Andras's colleague Vanscó Ödön became the link facilitator on the Budapest side.

The inevitable financial challenges of making a link work were considered and both sides were creative in meeting the costs of travel, hospitality and other in-country expenses. Project proposals were shared with colleagues and institutions. The project would be largely self-funded and the timing of a two-week visit in each direction would be to suit the academic timetables of the participating institutions. It proved best for the Bristol students to travel towards the end of the Easter term while the Budapest students travelled to Bristol in late October, early November. Students from one country who had made or were to make the visit, would play a major role in hosting visiting students.

So, it was in March 1995 that a group of 8 Bristol students with a tutor made a first visit to Budapest to benefit from an enriching experience of school visits and informal tutor-led sessions at the university where the practices of mathematics education in one country could be considered alongside the practices of another. Amongst other things, the content of lessons, the skills of teachers and the student-teacher relationships provoked much thought and discussion.

What might have been a single exchange turned out to be a 15-year enterprise in which several tutors from each country and maybe 300 students altogether

benefitted. The interwoven nature of the exchange programme enabled an ongoing and enriching professional dialogue, the long conversations, to emerge to the benefit of mathematics educators in both countries.

2 Reflections on taking part in the exchange from Laurinda Brown and ex-members of the exchange

Over time, a pattern emerged and planning for the link became easier since the timetables (see Tables 1 and 2) from both sides followed a familiar pattern once the dates had been agreed. One principle that emerged for both sides was that if you were visiting you had to get yourself to Bristol or Budapest (flight, car and hitch, as means of transport, were all represented) but, once there, in the country being visited, the link funded travel to schools, accommodation and food with a small amount of pocket money. In the UK, this funding came from a contribution from their first salary from each teacher who had travelled to Budapest the previous April when a student teacher. In Budapest, the group of student teachers who wanted to travel to Bristol the following October contributed directly to expenses.

The link stabilised on a maximum of six student teachers and a tutor travelling each way. For the student teachers on the PGCE course in Bristol hosting the Hungarian group, this was relatively near the start of their one-year studies. Hosting in Bristol was a challenge each year. The previous year's students who had travelled to Budapest, if they were still around in Bristol (not teaching a long way away), were keen to host their friends made in Budapest the previous April. Sometimes it was possible, through the university, to book, relatively cheaply, some accommodation together, most memorably, a house in the University Botanical Gardens (Ödön) and nurses' and doctors' quarters in the University Teaching Hospital (András). The link visit, in Bristol, served as a mechanism for the new group of PGCE mathematics students to bond. The six student teachers for the Budapest leg were identified by being those students centrally involved in the actual two weeks of the link.

In Budapest, the Hungarian group was usually six student teachers who had already been identified as travelling to Bristol the following October/November. Individual Bristol PGCE students were hosted by one of the Hungarian group and these pairings often set up friendships that still exist. As tutor, I stayed in a university hotel in the centre of Budapest, which meant that I could potentially support any students. The group of Hungarian students got to know each other well through organising the link so formed a strong catalyst for bonding with the new group of PGCE students in Bristol. Similarly, by Easter, when the PGCE group travelled to Budapest, they knew each other well and helped the Hungarian students to bond. There was a sense in which the link could not end, in that there was always a group of teachers who had supported the visitors and were anticipating travelling to their country later in the year.

Table 1: Typical timetable for the Budapest visit to Bristol.

Saturday 27th October	10.50h	Arrival Bristol Airport
Sunday 28th October	11.00h 12.00h – 14.00h 14.00h – 17.00h	Meeting at the University; briefing and orientation Maths Trail of Bristol and docks and packed lunch Visit to Explore @ Science Museum
Monday 29th October	10.00h - 13.00h Meet 19.00h	Session with PGCE Mathematics Developing Algebra Ten-pin bowling
Tuesday 30th October	09.00h – 12.00h Meet 17.00h	General teaching lecture programme Church bell ringing
Wednesday 31st October	09.00h – 12.00h Meet 19.00h	Mathematics lectures in School of Mathematics Cinema
Thursday 1st November	All day 19.15h – 22.00h	Sessions with PGCE Mathematics on Geometry and Assessment Scottish Dancing
Friday 2nd November	09.00 – 12.30h From 19.00h	Session with PGCE Mathematics on a Bowland Task, planning problem solving in school Halloween party
Saturday 3rd November	Day Trip From 17.30h	Bath or Cardiff Fireworks, Downs; fish and chips
Sunday 4th November	Day with last year's group	Playing board games; planning for school visits; hanging out
Monday 5th November		School visits (separate timetable), individually or in pairs
Tuesday 6th November		School visits (separate timetable), individually or in pairs
Wednesday 7th November	Whole group school visit	Kingsfield School
Thursday 8th November	Whole group school visit	The Ridings High School
Friday 9th November	10.00am 18.00h	De-briefing session at university Planet Pizza goodbye session

Saturday 10th April	Flight home	

Table 2: Typical timetable for the Bristol visit to Budapest.

6th April	14.00h	Arrival Ferihegy Airport
7th April	08.30 - 09.00h	Greeting at the University
	09.00 - 13.00h	Lecture from Lénárt István with break
	Afternoon	Buda-castle Sightseeing
For Laurinda	15.45 - 17.15h	Lecture, Mathematics Didactics Department Seminar
8th April	Morning	Visit to Hungarian Parliament
	14.00 - 15:30h	Common problem-solving lesson with Hungarian students, Ambrus András
	13.30 – 17.00h	Gellért hill
	17.00 – 18.30h	*Use of models and technology in Mathematics Education* lesson
9th April	Day outing	Visit to Bilingual School in Balatonalmádi
10th April	Day outing	Visit to Culture Center School of Győr
11th April	Day outing	Visit to Táncsics Mihály Bilingual Gymnasium Budapest
	Evening	Musical *Hair*, school production
12th April	Excursion	Szentendre, Visegrád, Esztergom
13th April	Excursion	Eger
14th April	Day outing	Visit to Czaban Samu Educational Center Budapest
15th April	Day outing	Gödöllő, school and Royal Palace
16th April	10.00 - 12.00h	Evaluation session with Ambrus András and Hungarian students in Mathematics Didactics Department
	18.00h	Farewell party
		Flight home tomorrow

Comparison of structures

Over time, for both sides of the link, various elements became standard as we learnt from our experiences:

1) *Time in school and in university sessions*: Both sides provided opportunities to experience what sessions in the university were like. In England, for the first week of the link, the schools were on holiday so the pattern became working together with the Hungarian group in sessions at

the university with the new group of PGCE students. In the second week, visits to schools took place. These visits were to the schools of those teachers who had visited Budapest the previous Easter, so, where possible, the Hungarian students travelled to see the friends they had made and hosted in Budapest. In Budapest, a different one of the Hungarian student teachers supported the Bristol group on day visits to schools.

2) *Social programme*: Those Bristol student teachers who were interested in visiting Budapest the following April were invited to prepare a programme of activities. One person would volunteer to be what we called the 'hit person' for a typical activity that they would normally be involved in where a group of 6 Hungarians and their tutor would be welcome. These activities varied each year, although 10-pin bowling, as a first activity for instance, proved to be a good ice-breaker. In Budapest, the day trips were organised by and participated in by the whole Hungarian group and normally would include a strenuous (by English standards) hike and a visit to the Parliament. One memorable trip was to the Statue Park, travelled to by a combination of bus and tram. We were requested to listen to the tape of music provided at the entrance as we walked around. In reflection afterwards, one Hungarian student said that the Russian-style statues and Russian military music had been her childhood and she had not understood when one day it was all taken away and put away in this park. There also seemed to be more cultural activity in Budapest, for instance Bach's *Mass in B minor* at St Matthias Church in Buda with a bemused group of Bristol student teachers who would probably have preferred a rock concert! The opening up to new experiences worked best when each group experienced the life of the other.
3) *Feedback/evaluation/de-briefing*: Looking through my files of notes, reflections and reports written after the visit to Budapest or after hosting the Hungarian group in Bristol, I am struck by the importance of the feedback sessions. András often ran the session in Budapest. I would normally facilitate the session in Bristol. In Bristol, we learnt to include this as part of our programme from the importance given to this aspect in early trips to Budapest. We not only reflected at the end of the two weeks in Budapest, but heads of schools would have programmed time for reflection over tea and cakes at the end of our visit and were interested in hearing what we had to say and to answer our questions. It was unusual, in Bristol, for head teachers to do the same.

After this background, the rest of this section will be focused on stories of changing perspectives through the link, often from feedback discussions. The school and classroom cultures, student-teacher relationships, the skills of teachers and the content of lessons continued to be the focus of thought and discussion over the years. The voices of student teachers from Bristol who went to Budapest on the exchange will be woven into the text. We initially see patterns over the

range of school visits, patterns within this new culture that do not exist at home. I would ask the Bristol student teachers visiting Budapest, "What's the same? What's different?" after each school visit to trap these perceptions. Over time, questions are raised and the discussions following the asking of these questions led to being able to see more of the context that is hidden at first, allowing us to see more and differently.

School and classroom cultures

The samenesses and differences in the school and classroom cultures can often be seen directly, although their implications take longer to emerge. What can be seen?

Table 3: Easily seen differences in school and classroom cultures

	Hungary	**England**
Class size	Up to 15, half classes	Variable, often 30 plus
Dress	Informal, both pupils and staff	Uniform, both pupils and staff (professional clothes)
Marking	Little sign of much marking of book in or out of class	Considerable time spent on marking by most teachers
Behaviour	Generally very good but children speak when others are speaking	Variable, but some real problems for most teachers, often linked to setting (e.g., lowest achievers grouped together)
Environment	Display of pupils' work very varied	Teachers have a room to teach their subject in so very good displays of pupils' work now the norm.

What needs time to be seen? A typical comment from a student teacher from Bristol walking around a typical Hungarian school was about the many, many pictures on the walls of the school corridors. These pictures are of what they call 'classes'. We do not have that in England. What has emerged over time is a structural aspect about Hungarian schools that then accounts for many of the differences. As students enter the school, they are placed with a teacher in a grouping that will be for all their lessons and they will have a home room where

they relax and also learn since most of their lessons are there. There is at least 15 minutes between lessons for students to do what they like, including watching television, longer at lunchtime. The pictures on the walls are of groups of students leaving the school. They take responsibility as a class for the design and the tutor is included. Although in England students are placed in tutor groups with a teacher, this is for pastoral care and the students are often in sets by achievement for their lessons so are not taught together and the tutor group identity is not so strong. This also explains why there are few displays in classrooms, because the teachers move around to teach the students and enter the children's home room, which is decorated with their things. In England, the children enter the teacher's space for a lesson.

Why are the children generally well-behaved in Hungary? In England, teachers have no real power over children. However, in Hungary it turned out that it is the teacher who assesses children and, if a child has a low grade in one subject they have to spend the whole of the next year redoing the year in all subjects. It is also the case that, in some sense, schools are setted. Students can apply to the school of their choice from anywhere in Hungary and some children move to live in dormitories in Budapest to attend a particular school. One aspect of behaviour that was shocking for someone from England is that the children are not made to attend when a student or the teacher is at the board explaining homework. There might be two or three students writing solutions at any one time and the rest are sorting out their homework, which will not be marked.

Here are some more thoughts from teachers from England:

> I was impressed in lessons we saw in Hungary how quiet and studious the students were at the gymnasiums; there was no off-task behaviour. It was far more of a lecture format. I was not sure that I could learn a lot about teaching in my own classroom with more rowdy state school English students. We were told that in Hungary there were no concessions to different abilities, that everyone was just expected to keep up and if students were struggling they needed to catch up in their own time, however, I remember one of the lessons we observed when students were given time to work on some questions, I think it was simultaneous equations. When the first two students finished they were given whiteboard pens and asked to write the answers on the board. I liked this subtle way of giving the other students extra time to work while giving the fastest students something to do while they waited for the others. It is a simple technique that I use often in my own lessons and students love the opportunity to show what they can do. (Megan Bridge)

> Visiting Hungarian schools in 1998 there was a kind of order that I was not used to in schools. Each school we visited, the students were walking around calmly, with no school uniform, and chatting as they made their way to their next lessons. In the classroom, the students entered and sat down before a

teacher arrived. A class 'captain' would take a register and then proceed to check that every student had done their homework and that it was all correct. Any mistakes were discussed on the board and corrected in their books.

About ten minutes after the students had arrived, the teacher entered the room and went to his or her desk. The class stood and the 'captain' then reported to the teacher that the class were all present, or not, and that the homework was completed correctly. Any students that had failed to get the perfect "5" for their homework, the highest grade awarded, were also duly noted. The teacher then greeted the class and told them to sit.

The formalities out of the way, the teacher was then able to get straight on with the business of teaching. This usually involved working with some students at the board whilst other groups of students worked on things without any need for supervision. Again, the calm purposeful atmosphere, with pretty much 100% engagement with the work, was a pleasant surprise. Many were working on questions taken from a standard book of questions issued by the government containing thousands of in-depth maths questions. Public exams apparently consisted of students sitting in a hall, each with a copy of this green book, and listening to a radio. An announcement would be made as to which questions, from the book, were to be completed by every student in the country. So, the idea being, the more questions you have done in advance means you may have already done those questions required. (Mike Rees)

The skills of teachers

One difference that seemed to be immediately striking to Bristol student teachers in Budapest was summed up by one visitor as, "Nothing's new". From an English perspective, a lot of time is taken up with teachers wanting to motivate their classes and they want to introduce new topics in an engaging way. This simply did not happen in Hungary. English teachers are also skilled at continuous assessment and working with children's misconceptions. Hungarian teachers do not mark, which can seem 'wrong' at first. Discussions revealed the following:

> From the very beginning, children should undertake the task of checking the outcome of their work instead of leaving it to the teacher to decide whether the result is correct, or not. It is, on the other hand, the job of the teacher to create an atmosphere in which even erroneous views or formulation can be freely expressed. The teacher should direct their work, orient their discussion in such a way that the children themselves could distinguish between correct and false, consistent and inconsistent, effect or ineffective. Try to develop critical awareness in children, strengthen their willingness to discover errors and correct them. (Ambrus, 1996, Commentary on Principle 7, "Supervision, evaluation, errors", of Tamás Varga's *Principles of Methodology*, p. 10)

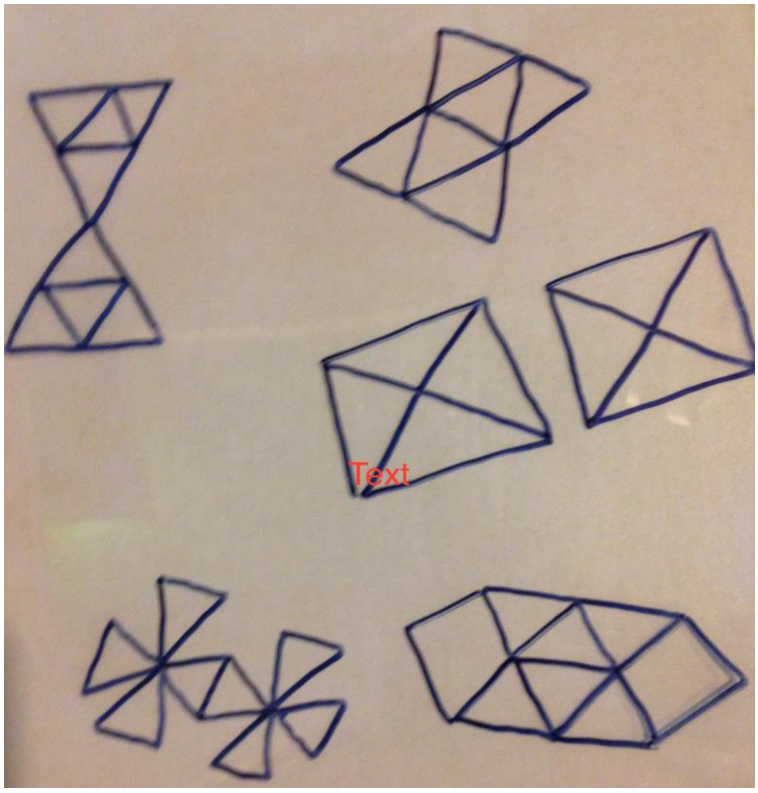
There is homework given after every class and the beginnings of lessons, instead of being teacher-led as in England, are student-led. Time is spent while two or three children go to the board and write homework solutions. In England, everyone would need to be in silence, looking at them, but in Hungary, children are responsible for checking their errors, "being active in discovering errors and correcting them".

This principle is illustrated by the following e-message in response to my request for stories of how their current practice had been influenced by their time in Hungary:

> A lot has happened since Easter 2006 when I went to Budapest but one observation then seems to have shaped how I aim to have learning taking place in my maths classroom to this day. In a Hungarian school, we watched a lesson on transformations. We couldn't understand the spoken language, which certainly helped my focus. I only had one reason to be there and it was "What were the learners expected to see and do?" It was simple really, they were expected to get involved by questioning the methods, the links, the teacher and themselves. They were also expected to do the maths. The teacher didn't seem to offer 'answers' he just kept putting the thoughts and ideas of the students on the board. He would let them fail, rub out parts and take more instructions. The teacher challenged the learners for the whole lesson mainly due to the relationship between everyone in that room. There was trust. Trust that *when* you fall everyone is on hand to pick you back up. 11 years on I can look back and say that this observation, mid-way through my training year, is still resonating now. I talk about that exchange to current staff and students now and how interesting, and with hindsight, important it was for my career. The comfort of support and high expectations are what I feel are the most important aspects to becoming a successful learner. Without the trip to Hungary would I teach like this? I don't know. (Neil Stewart)

My own awareness beyond the basic level of seeing difference was educated in a lesson observation shared with András and the Bristol group. The children were young and the class was around 30 students. The teacher invited the students to draw different nets of an octahedron. We were seated in a row at the back of the classroom. The teacher was not going around the room looking at what the children were doing, a typical teacher behaviour in England. I asked András if it would be alright if I walked around and looked. He asked, "Why would you want to do that?" When I went around looking I collected a few of the drawings the children were making. What would you, as a teacher, do with these responses?

Figure 1: Nets of an octahedron?



There was no interest or surprise in reaction to the images I had collected. There was no teacher lust to work with the children to identify properties of nets, for instance. An octahedron was opened out to show the net by the teacher in various ways. The children interacted with their diagrams. András explained that the curriculum organisation was spiral so that the concept of a net would be repeatedly visited over future years and what was important at the moment was the children's engagement. This observation happened on an early visit to Budapest for me and I was still reacting to the differences without any sense of where those differences were coming from. What was highlighted was my own image of teaching as working with students' misconceptions and in Hungary that was the students' work, not mine.

Another snapshot from a teacher who went to Budapest as a student teacher:

> We observed a lesson with two Roma children with two teachers. As observers, we outnumbered the class; the teachers carried on as if we were not there. We saw a lovely lesson for the children with learning difficulties. They were learning about position and everything they did was practical and physical. They climbed over the tables, under the tables, sat on the tables and walked around the tables. I teach secondary school students and have not had to teach children such primary level mathematics but it showed me that mathematics can be fun and engaging at any level and I sometimes think of that lesson when I am thinking about how I can make lessons engaging for my own lower achieving sets. It reminds me to get them out of their seats and doing practical activities. In my own education, the first mathematics lessons

> I remember were column method addition and multiplication so when I was thinking about how I start teaching my own son mathematics I did not know where I would start. I think back to this lesson to remind myself that mathematics does not start with numbers. (Megan Bridge)

Content of lessons

> I did not know what to expect when we went in to our seminar with Lénárt István. Initially I thought he seemed a little crazy, but I found him to be compelling. He gave us a lesson on spherical geometry using his own Lénárt sphere, a transparent, plastic sphere which we drew on using marker pens. We discovered facts about such things as joining points by the shortest route and the sum of angles of a triangle drawn on a sphere. Spherical geometry was totally new to me and it was so enlightening. It gave me a new perspective and understanding of Euclidean geometry in much the same way as learning a new language can give one a greater understanding of English. (Megan Bridge)

Initially, the focus on geometry in the Hungarian curriculum was powerful for Bristol PGCE students who had done no Euclidean geometry at school. As an editor of a professional journal, *Mathematics Teaching* and later an international research journal, *For the learning of mathematics*, I invited Lénárt István to write about his thinking that underpinned these sessions given the way that his teaching captivated both myself and different groups of PGCE students over the years. (Lénárt, 1991; 2004). Our equivalent was letting the Hungarian student teachers experience straight mathematics lectures at the university and there was a feeling of relief for them that, after visits to schools where the teaching styles were so different than at home and children appeared more challenging to teach, they ended up was sitting in mathematics lectures on, say, abstract algebra and differential equations, that felt similar to those at home.

At the time, in the early days, there had been a PISA test in which England did well and a TIMSS test in which Hungary did well. Our governments only looked at the test that seemed to need work and Hungary implemented the Angol curriculum, interpreted as giving some time to teachers to choose what they taught in some lessons and there was more of a focus in England on skills, rigour, accuracy and speed, with some new curriculum material purporting to be based on Hungarian methods. András and I believed that we were on track, in mathematics classroom strategies and focus, to pass each other going in different directions.

> As we visited schools around Budapest to observe mathematics lessons we became used to the fairly informal atmosphere and a lot of student involvement in the teaching. I was therefore quite surprised, in one school, to be shown into a tiered lecture theatre more reminiscent of undergraduate lectures. The

students were sitting in the front rows of the theatre and the topic of the lesson was solving quadratic equations.

I don't remember all the detail of the lesson, but I do remember that it soon became clear that the layout of the lecture theatre did not mean the style of teaching would be particularly different from what we had seen elsewhere.

Students had large pieces of sugar paper with quadratic equations written on them in thick felt pen, some in the form $ax^2 + bx + c = 0$ and others with factorised forms. Some had pairs of solutions. With one or two students directing the class, students began to match up their different representations of the equations and thus solve them. The pieces of sugar paper were stuck onto the blackboards to show the stages of the solutions.

My expectations of what happens in lecture theatres were turned on their head by the active involvement of all the students with everyone moving around and contributing their pieces of information to the solution of all the equations and the gradual drawing out of the underlying methods. And the awkwardness of getting up to the board and moving around the theatre didn't seem to make any difference to the students' engagement! (Jan Winter, tutor)

I became aware of thinking that in Hungary teachers taught mathematics, in that we observed students doing challenging mathematics that often would not be attempted in England. This was not mathematics teaching where students were passive recipients, however. The students' task was learning the mathematics. Interestingly, only a few practice lessons were needed as part of the teacher education programme, because the student teachers were teaching as they had themselves been taught. Students were independent of their teachers whose role was to create the culture in the classroom. Such insights fed into the university teaching at the University of Bristol, particularly the algebra and geometry sessions, which were planned using discussions between the two cultures. A focus on solving quadratic equations was particularly surprising for both sides in the ways they approached the tasks.

3 Reflections on professional engagement with Bristol over 20 years from Jánossy Zsolt: A year in Bristol

It was my first lucky day when I applied for a grant, supported by The British Council, to join the PGCE course in mathematics at the University of Bristol and the second one was when I received the grant by accident. Originally, the programme was organised for graduating students of ELTE and I had already been teaching for two years in a secondary school. I was encouraged by my friends and colleagues to submit the application and discouraged by my boss at school and some relatives because they did not want me to leave school and family behind for a whole year. A few decades after having finished the PGCE course with a

special component of Physics, I know that it was a once-in-a-lifetime chance for me to develop my skills as a teacher.

The PGCE course had two major components: one at the university taught by two wonderful tutors Laurinda Brown and John Hayter, and another one which was a long full-time teaching practice. The learning/teaching method in the university sessions were completely new to me. We were used to more conservative approaches in Hungary at that time. Discussions, cooperation, expressing opinions, sharing ideas and critically analysing the ideas of others proved to be essential elements of our everyday work at the University in Bristol. The discussions led by our tutors during sessions always gave practical ideas and advice based on well-tried practices and methodology but at the same time we were continually challenged by questions and problems of advanced mathematics linked to school topics. The teaching practice was the most difficult part of the PGCE course for me. Being a new member of staff at a school is not easy itself but teaching in a foreign language makes the whole task almost impossible to complete perfectly. Obviously, the time spent at schools and the non-stop communication with fellow students contributed a lot to the development of my English language skills. I also experienced another interesting issue. People who lose one of their senses, tend to compensate with the improvement of other senses. That is what I experienced while I was trying to do my best during my teaching practice. Being a non-native speaker of English having limited (classroom) language skills, I had to compensate with some other skills of teaching. With the help of my tutors and the heads of department at Bristol Grammar School I also had a chance to teach Physics during my teaching practice.

During the time I spent in Bristol, I managed to study and understand another culture and educational system and I believe that I have benefitted a lot from this experience in my work and everyday life. I became a more mature and experienced teacher with lots of new skills who was a lot more open to new people, ideas and approaches. I have felt grateful for this wonderful opportunity ever since.

The years of cooperation

For several years from 1995, Török Ignác Secondary School, Gödöllő hosted Bristol PGCE student teachers led by their tutors and teachers involved in the teacher training programme of ELTE. The visitors observed lessons of different subjects and age groups and participated in discussions where they were given a short introduction to the Hungarian educational system and had a chance to discuss issues related to the Hungarian and the English school systems. In the afternoon, the English guests enjoyed cultural activities, usually visiting the Royal Palace of Gödöllő. I believe that both the English and the Hungarian participants benefitted a lot from these visits.

Learning by Teaching – Teaching by Learning: Erasmus+ Project of Török Ignác Secondary School, Gödöllő, Hungary

In 2015 and 2016, I again travelled to Bristol and met my former tutors to start a new, Erasmus+ collaboration between my school and the university. Three of us, school teachers, visited the University of Bristol and secondary schools in and around Bristol. Our activities focused on gathering information about the teacher training programme at the University of Bristol and observing the mentoring process of pre-professional student teachers in different secondary schools. The time we spent in Bristol offered an excellent opportunity for us to learn about English educational and mentoring practices as well as share ideas and experiences. This cross-cultural interaction enhanced our teaching practices as we observed some useful exercises and were shown English websites designed to establish a classroom climate conducive to learning. Working closely with English teachers was a wonderful way to observe how English professionals engage students in planned learning activities and how they evaluate, act upon and report progress in learning. It was useful for us to see how these schools were responsive to students with special needs and how committed they were to developing the students' full potential by providing additional educational support. As being a mentor to student teachers is a new profession in Hungary, it was interesting for us to study two different ways of mentoring in Bristol. We liked how closely the University of Bristol tried to work with schools in developing the skills of student teachers, which (unfortunately) is not typical in Hungary. We considered the practice of rotating student teachers among schools to be very useful. By working in different educational institutions, pre-professionals are forced to learn how to work with a wide range of students and experience different teaching roles. After coming home, we shared our experiences with colleagues at several meetings.

4 Final reflections

It is easy to experience difference as 'wrong' but the power of the link was in opening up difference as throwing a light on taken-for-granted practices at home. In England, almost every school has a uniform and this is seen as important as part of the discipline structures of the school. Staff also effectively have a uniform, men often in suits and ties and women professionally dressed. Entry to a Hungarian classroom, with students dressed, as we would see it, informally with teachers in blue jeans, raised questions about the need for uniform at home. This does not mean that it would be easy to implement a non-uniform policy in England because cultural expectations, including what parents want, are important. Similarly, in mathematics, in the UK, faced with a quadratic equation, children are likely to explore various options to finding a solution prior to using the formula. Hungarian students are likely to quickly apply the formula, and, on being asked, "Why not factorise?", one Hungarian student teacher said to me, "Why

would I want to think about that?" Why isn't there more of a focus on geometry in the UK? There has been introduction of statistics into the curriculum in Hungary, less focus on geometry presumably, why? International comparisons or a belief in the power of statistics in describing our world? Or a bit of both?

English student teachers in Hungary enjoyed the focus on mathematics, developing insights into teaching approaches to be used. Why don't we do that in Bristol? Similarly, in Bristol, as the Hungarian system was changing and ELTE students were facing more challenging groups of students, one said to me at the feedback session of the Bristol leg of the exchange, "I've learnt more about teaching mathematics here in a week than at home in 4 years". But that does not mean that one system is better than the other. The power of the exchange is that difference opens us up to see what otherwise is taken for granted at home. It used to be the case that in Hungary teachers were able to teach mathematics given that behaviour was generally good, and, in Bristol, we needed to work with our student teachers on pedagogy, teaching children mathematics, because of behavioral issues. In England, there is an increasing focus on the mathematics in the new National Curriculum (2014) and in Hungary more of a need to teach children as times change. In England, there is more of a focus on continuous assessment and external assessments and our children are, consequently, even less independent. Marking continues to take up a disproportionate amount of time in England and parents expect teachers to be marking thoroughly.

Working with the Hungarian didacticians and teachers over the years has been a pleasure and a privilege. I have not previously wanted to write about our experiences, braiding as they do personal friendships with professional ones, but have made an exception to mark the 75th birthday of Ambrus András whose enthusiasm for mathematics and pleasure in teaching problem solving has enriched the Budapest/Bristol link.

References

Ambrus, A. (1996, Ed.). *Mathematics Education in Hungary: Report for ICME – 8*.

Lénárt, I. (1991) The drawing ball set. *Mathematics Teaching* 134, 30-34.

Lénárt, I. (2004). Sing mathematics together: Thoughts on the future of a school subject. *For the learning of mathematics 24*(2), 22-26.

Lénárt, I. (2004). What is wrong with the teaching of algebra? *For the learning of mathematics 24*(3), 30-32.